THE ATOMIC ENERGY ESTABLISHMENT TROMBAY

The Atomic Energy Establishment at Trombay, near Bombay, which was formally inaugurated exactly two years ago, is the Indian centre for research and development work in the field of atomic energy. The 2,400-acre Establishment is the heart of the Indian Atomic Energy Commission's activities in the field of research, and it is here that new ideas and methods are developed which can later be utilised on an industrial scale.

Over 800 Indian scientists and technical personnel are presently working for the Establishment, to put atomic energy to work for the benefit of India. (In 1954, there were only 215).

To ensure a steady supply of trained scientific and technical personnel, the Establishment started a training programme two years ago under which 250 young graduates and engineers are recruited annually from the universities and given supplementary training for a year to fit them for work in India's atomic energy programme. It is hoped to increase the intake of this Training School to 350 a year in due course.

Almost all the instruments and electronic components that are needed in nuclear energy work are now being made in the Trombay Establishment, thus making the country self-sufficient in this vital field, and saving considerable foreign exchange.

Whatever India may have achieved in the field of atomic energy has been achieved by a concentration of effort and resources, by a selection of some of the best young scientists and engineers from all parts of the country and their concentration in one big research and development centre at Trombay, where they assist and stimulate each other, and finally by a provision of the best available equipment.

The Trombay Establishment (whose work is split up into 14 divisions, which are, in turn, grouped into 4 main groups: the Physics, the Chemistry, the Engineering, and Biology Divisions) includes India's first reactor, APSARA; THE RADIOCHEMISTRY LABORATORY, and THE THORIUM PROCESSING PLANT. Nearing completion are the Canada-India Reactor, Zerlina a Zero Energy reactor, a Uranium Metal Plant, and plants for processing fuels and moderators.

APSARA REACTOR

Apsara, India's first atomic reactor, which went into operation 2½ years ago (August 4, 1956), is proving a very useful facility for research in many fields. It is the first reactor to go into operation in Asia, outside the U.S.S.R. It was designed, engineered and built entirely by Indian scientists and engineers and by Indian industry, except for the fuel elements. The fuel elements (convex plates of enriched uranium alloyed with aluminium and canned in aluminium) have been provided by the U.K. Atomic Energy Authority. It was built in the spcce of only a year after design finalisation.

This small-sized reactor, which cost Rs.35 lakhs (£.260 thousand), is producing radioisotopes which are already being extensively used by Indian agriculture, medicine and industry., and research workers at the universities. Apsara is the nation's principal facility for training personnel in reactor technology and for fundamental research in physics, engineering and biology, which require the use of strong fluxes of neutrons.

ZERLINA

A second reactor, ZERLINA (zero energy reactor for lattice invistigations and new assemblies), is being built and will go into operation by the middle of 1959. This reactor will be very useful in the study and design of new reactor systems.

CANADA-INDIA REACTOR

India's third research reactor will be the Rs.7½-crore (£ 5.3-million) Canada-India Reactor, now under construction at Trombay. When it goes into operation next year, India will possess one of the best isotope producers in the world, with which it will be able to produce the full range of radioactive isotopes. This reactor is based on the design of the NRX Reactor at Chalk River, Ontario (Canada), with substantial modifications to allow for its installtion in a tropical country close to a large centre of population and with many improvements based on Canadian experience. A joint Indo-Canadian project, Canada's share (£ 2.75 million) being provided under the Colombo Plan, this reactor is the first major atomic energy project to be undertaken in the field of international assistance. The reactor will require some 20 tons of heavy water, which has been sold to India by the U.S. Atomic Energy Commission.

RADIOCHEMISTRY LABORATORY

This Laboratory, which was built early last year, is a start to train a team of chemists in the handling of highly radioactive substances. An important function of the Laboratory is to assist all Divisions of the Establishment in the use and handling of radioactive materials in their experiments. Dr. Welch, a senior scientist from the U.K. who is here under the Colombo Plan, is presently assisting in directing and organising the work of the Laboratory. The Laboratory was set up under the supervision of a U.K. scientist, G.R. Hall, seconded from the Atomic Energy Research Establishment at Harwell.

THORIUM PLANT

The 4-year-old Thorium Plant produces two much-needed raw materials for atomic energy developments: over 300 tons of thorium and a few tons of uranium a year, which is equivalent in fuel value to roughly 1,000 million tons of coal. This is about 30 times the present annual production of coal in India. The plant was built entirely by Indian scientists and engineers. Its capacity was increased six-fold last year. The plant is one of the largest in the world for the production of thorium nitrate. Besides supplying virtually the entire requirements of the gas mantle industry in Asia, it also supplied markets in Europe and America, helping India to save foreign exchange by meeting local requirements and is earning valuable foreign exchange by exports. A part of the production of the plant is also stockpiled according to a planned programme for future use in India's atomic energy programme.

URANIUM METAL PLANT

The production of adequate supplies of uranium is the basic requirement for a self-sufficient atomic energy programme and, accordingly, a plant has been set up at Trombay to process uranium concentrates into reactor-grade uranium metal for experimental purposes and for use in the reactors that are under construction at Trombay. It has already provided necessary experience for the design and construction of the large uranium plants which will be required for a full-scale atomic power programme.

FUEL ELEMENT FABRICATION PLANT

A "fuel element" is the form in which fuel is inserted into a nuclear reactor. Usually it is a cylindrical rod of uranium sealed into a container or "can" of magnesium/aluminium alloy. The uranium metal produced at the Uranium Metal Plant will be rolled into rods of suitable sizes at the Fuel Element Plant for use in India's reactors.